WE CLAIM:

1. A method for generating an array of molecular moieties on a porous substrate surface divided into a plurality of discrete surface sites, the method comprising applying focused acoustic energy to each of a plurality of a reservoirs each containing a molecular moiety in a fluid, wherein the focused acoustic energy is applied using an acoustic ejector comprised of an acoustic radiation generator and a focusing means in a manner effective to eject a droplet from each reservoir toward the substrate surface such that the molecular moiety in each droplet attaches to a localized region within a different surface site.

2. The method of claim 1, wherein each molecular moiety is different.

3. The method of claim 2, wherein a droplet is ejected toward each surface site, such that every surface site has a molecular moiety attached thereto.

4. The method of claim 3, wherein each molecular moiety is different.

5. The method of claim 1, wherein the molecular moieties are biomolecules.

6. The method of claim 5, wherein the biomolecules are nucleotidic.

7. The method of claim 6, wherein the biomolecules are oligonucleotides.

8. The method of claim 7, wherein the biomolecules are nucleotidic monomers, and the method further comprises stepwise synthesis of an oligonucleotide within each surface site by repeated deposition of individual nucleotidic monomers at each site using focused acoustic energy.

9. The method of claim 5, wherein the biomolecules are peptidic.

10. The method of claim 3, wherein the porous substrate surface is comprised of at least 62,500 discrete surface sites.

11. The method of claim 10, wherein the porous substrate surface is comprised of at least 250,000 discrete surface sites.

12. The method of claim 11, wherein the porous substrate surface is comprised of at least 1,000,000 discrete surface sites.

13. The method of claim 12, wherein the porous substrate surface is comprised of at least 1,500,000 discrete surface sites.

14. A molecular array comprised of a plurality of different molecular moieties on a porous substrate surface divided into a plurality of discrete surface sites, each site containing one molecular moiety attached to the substrate surface in a localized region within the site, wherein the different sites are present at a density of at least 62,500 sites per square centimeter.

15. The molecular array of claim 14, wherein the density is at least 250,000 sites per square centimeter.

16. The molecular array of claim 15, wherein the density is at least 1,000,000 sites per square centimeter.

17. The molecular array of claim 16, wherein the density is at least 1,500,000 sites per square centimeter.

18. The molecular array of claim 14, wherein each molecular moiety is different.

19. The molecular array of claim 13, wherein the molecular moieties are biomolecules.

20. The molecular array of claim 19, wherein the biomolecules are oligonucleotides.

21. The molecular array of claim 20, wherein the biomolecules are peptidic.